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SURVEY BULLETIN

Forest Insect and Disease Conditions in Ontario

Spring 1987

Bruce spanworm, *Operophtera bruceata* (Hlst.), feeding damage on sugar maple (*Acer saccharum* Marsh.)

GREAT LAKES FORESTRY CENTRE
Box 490 • Sault Ste. Marie Ontario

FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO
Spring 1987

This is the first of three Survey Bulletins describing forest insect and disease conditions in Ontario in 1987.

RETIREMENT

Mr. Murray J. Thomson, a long-time Forest Insect and Disease Survey (FIDS) technician, retired on 1 May 1987, after 35 years of service with the FIDS Unit. Murray served with the Canadian Army in Europe during World War II and was employed by Kerr Addison Mines before joining the federal public service in 1957. During his career as a FIDS technician he undertook field assignments in the Swastika, Tweed, Lindsay, Fort Frances, Sioux Lookout and Sault Ste. Marie districts. His extensive experience will be a loss to the Unit and he will be greatly missed.

Murray J. Thomson

STAFF CHANGES

There are a number of changes in field assignments in 1987. Mr. David Constable was transferred from Sioux Lookout to Sault Ste. Marie to fill the regional supervisor position vacated by M.J. Thomson, who retired. Mr. Charles (Chuck) Jones was promoted to regional supervisor and will move from Kemptville to Sioux Lookout. The vacancy created by this move will be filled by Alan Keizer who will be transferred from Chapleau to Kemptville. Alan, in turn, will be replaced by Steve Payne, who will move from Geraldton to Chapleau. A new recruit, Simon Melbourne, will be assigned to the Geraldton District. A complete list of field assignments is given below.

RANGER FIELD ASSIGNMENTS 1987

REGION		
Northwestern	C.G. Jones	R.R. #1, Site 25 P.O. Box 9 Sioux Lookout, Ontario P0V 2T0 (807) 737-3630
	E.J. Czerwinski	210 Butler Avenue Fort Frances, Ontario P9A 2N7 (807) 274-6821
North Central	H.J. Evans	R.R. #6, Station F Thunder Bay, Ontario P7C 5N5 (807) 939-1142
	S. Melbourne	P.O. Box 495 Geraldton, Ontario P0T 1M0 (807) 854-1317
Northern	L.S. MacLeod	P.O. Box 267 Temagami, Ontario (705) 569-3467
	S. Payne	P.O. Box 817 Chapleau, Ontario (705) 864-1042
	V. Jansons	P.O. Box 202 Moonbeam, Ontario P0L 1V0 (705) 367-2185
Northeastern	D.C. Constable	P.O. Box 490 Sault Ste. Marie, Ontario P6A 5M7 (705) 949-9461
	W. Ingram	S.S.#1, Site 5 Box 7 Sudbury, Ontario P3E 1X2 (705) 674-0453

Algonquin and Eastern	R.J. Sajan	P.O. Box 550 Minden, Ontario K0M 2K0 (705) 286-2650
	B.E. Smith	Petawawa National Forestry Institute Chalk River, Ontario K0J 1J0 (613) 519-2932
	A. Keizer	P.O. Box 1150 Kemptville, Ontario K0G 1J0 (613) 258-5664
Central and Southwestern	W.D. Biggs	P.O. Box 100 Angus, Ontario L0M 1B0 (705) 424-5721
	H. Brodersen	P.O. Box 148 St. Williams, Ontario N0E 1P0 (519) 586-2041

SPECIAL SURVEYS OF WHITE PINE AND BLACK SPRUCE PLANTATIONS IN 1986

These surveys are part of a long-term study to collect baseline data on pests affecting conifer plantations in the province and to monitor current pest conditions. In 1986, surveys focused on white pine in southern Ontario and black spruce in northern Ontario.

WHITE PINE PLANTATIONS

Each FIDS technician in southern Ontario examined six plantations, two each in the <2 m, 2 m–6 m and >6 m height categories. Two visits were made to each plantation to coincide with the feeding period of expected pests. In all, 5,700 trees in 38 plantations were examined and the following results were obtained.

Insects

Over all, little serious damage occurred in the 38 plantations examined. The most prevalent insect encountered, the pine spittlebug, *Aphrophora cribrata* (Walker), was recovered from 937 trees or 16% of the total. The insect was found in 24 of 38 plantations and was distributed fairly evenly throughout the area of the survey. Although high concentrations of insects were observed in some areas, no serious damage resulted. The pine bark adelgid, *Pineus strobi* (Htg.), was the second most abundant insect and was found on 477 trees or 8% of the total. Most of these were found in the Eastern and Northeastern regions where 29% and 14%, respectively, of the trees were infested; however, low populations were also detected in the Central and Southwestern regions. In all areas examined no serious damage was observed. The white pine weevil, *Pissodes strobi* (Peck), was found in 17 of the 38 plantations but attacked only 150 of 5,700 trees or 3% of the total. It was recorded in all five regions (Southwestern, Central, Algonquin, Eastern and Northeastern), with incidence ranging from 1% to 4%. A number of other insects were collected during the survey but damage in all cases was negligible. These included the eastern pine shoot borer, *Eucosma gloriola* Heinr., the fir coneworm, *Dioryctria abietivorella* (Grt.), the pine false webworm, *Acantholyda erythrocephala* (Linn.), the introduced pine sawfly, *Diprion similis* (Htg.), the northern pine weevil, *Pissodes approximatus* Hopk., and aphids of various species. Feeding damage by porcupine was recorded in four plantations and damage by sapsuckers was recorded in two plantations.

Diseases

Very little damage was caused by diseases or abiotic conditions. The most serious disease noted was white pine blister rust, *Cronartium ribicola* J.C. Fischer, which was recorded on 76 trees, or 1.3% of the total. Armillaria root rot, *Armillaria mellea* (Vahl:Fr.) Kummer, and stem cankers of undetermined origin were found on less than 1% of the trees. Foliage problems in the form of frost damage, winter drying and, in a few cases, needle cast, were observed on 320 trees, or 6% of the total.

BLACK SPRUCE PLANTATIONS

A survey of black spruce plantations was conducted in northern Ontario. As in the white pine plantation survey in southern Ontario, each technician examined six plantations, two each in the < 6 m, 2 m–6 m, and > 6 m height classes. In all, 6,300 trees were examined in 42 plantations. The following results were obtained.

Insects

As expected, the most commonly encountered pest was the spruce budworm, *Choristoneura fumiferana* (Clem.), which infested 1,435 trees or 23% of the total. It was found in 24 of the 42 plantations, mainly in the Northwestern and North Central regions. This was expected because the largest part of the current budworm infestation occurred in these regions. The second most commonly found insect was the white pine weevil; however, it was found only on 38 of the 6,300 trees or .6% of the total. It was encountered in 11 of the 42 plantations, all of which were in the Northwestern and North Central regions. The spruce coneworm, *Dioryctria reniculelloides* Mut. & Mun., was found on four trees and the yellowheaded spruce sawfly, *Pikonema alaskensis* (Roh.), was observed on one tree. Other insects encountered during the survey were as follows: the blackheaded budworm, *Acleris variana* (Fern.), the spruce bud midge, *Rhabdophaga swainei* Felt., the greenheaded spruce sawfly, *Pikonema dimmockii* (Cress.), the ragged gall adelgid, *Pineus similis* (Gill.), and several species of aphids. None of these caused any significant damage.

Diseases

The spruce needle rusts, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary and *C. ledicola* (Peck) Lagerb., were the diseases most commonly found. Of 1,790 trees, 28% were infected, 61% of them in the North Central Region. Frost damage was recorded on 1,719 trees or 27% of the total. It was found in all three regions (Northwestern, Northern and North Central) but was most prevalent in the North Central Region. The only other disease recorded was Armillaria root rot, which was found on eight trees, most of them in the North Central Region.

CONE AND SEED STUDY 1986

This is also a long-term study to collect baseline data and assess the impact of various pests on conifer species in Ontario. The species selected for study in 1986 were black spruce in northern Ontario and white pine in southern Ontario. Each FIDS technician in the Northern, North Central and Northwestern regions attempted to make two collections of 100 black spruce cones each, one from an upland site and the other from a lowland site. These were mature cones that had not yet hardened off. Similarly, each FIDS technician in the Northeastern, Algonquin, Eastern, Central and Southwestern regions collected 100 second-year mature, but still-green, white pine cones. In all cases, the cones were shipped to the Great Lakes Forestry Centre (GLFC) for dissection and analysis. Results were as follows:

Black Spruce

In all, 1,296 cones were examined, and 19% of them were damaged. Seed loss within the total sample was approximately 8%. The principal insects causing the damage included the spruce cone maggot, *Lasioma anthracina* Tripp, the spruce cone gall midge, *Dasineura canadensis* Felt, the white pine coneborer, *Eucosma tocullionana* Heinr., the spruce seed chalcid, *Megastigmus atedius* Wlk. and unidentified lepidoptera. Some cones also showed evidence of mechanical damage. No cone diseases were discovered. The highest percentage of damaged cones (45%) was recorded in Gross Township, Kirkland Lake District; the damage was caused by the spruce cone maggot and the spruce cone axis midge. In a collection from Satterly Township Seed Production Area (SPA) in Dryden District, 41% of the cones were damaged by the spruce cone axis midge and unidentified lepidoptera, and in McAree Township, Sioux Lookout District, 36% of the cones were damaged by the spruce cone maggot and unidentified lepidoptera.

White Pine

In all, 618 cones were examined; 181 or 29% of them were damaged. Overall seed loss in this sample was 26%. The principal agents causing the damage were white pine coneworm, *Eucosma tocullionana* Heinr., the white pine cone beetle, *Conophthorus coniperda* (Sz.), a resin midge, *Resseliella* spp., the spruce seed chalcid, *Megastigmus atedius* Wlk., the jack pine budworm, *Choristoneura pinus pinus* Free, unidentified lepidoptera and other unknown agents. By far the highest percentage of damaged cones (88%) was found in Charlotteville Township, Simcoe District; seed loss was 38%. The damage was caused by the white pine coneworm and a resin midge. In Wylie Township, Pembroke District, 40% of the cones were damaged by the resin midge, white pine coneworm and white pine cone beetle. Thirty-four percent of the cones were damaged by the resin midge and white pine coneworm in Gurd Township, North Bay District.

SURVEYS PLANNED FOR 1987

Pheromone Trapping

Each year FIDS staff carry out pheromone trapping for a number of insects. They attempt to detect the presence of insect populations, to determine the flight period of certain species, to monitor population and distribution changes and to continue to develop pheromone trapping as a survey method. This year pheromone trapping will be carried out for the following insects.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

For the past several years spruce budworm pheromone trapping has been carried out at a number of sites at which other data such as defoliation estimates, early larval densities and egg-mass numbers are obtained. This is to determine the comparative effectiveness of pheromone trapping in evaluating population levels. Various pheromone lures and types of traps have been evaluated. This year trapping will occur in more than 50 locations in a continuation of this program.

Pheromone trapping will also be carried out in conjunction with light trap operations at a number of locations to determine the relative effectiveness of the two methods in determining the adult flight period.

Gypsy Moth, *(Lymantria dispar* L.)

This pheromone trapping program has been carried out for a number of years. In a cooperative effort with the Plant Health Branch of Agriculture Canada, FIDS staff carry out a pheromone trapping program in most provincial parks and some private campgrounds in northern Ontario. In southern Ontario, a similar program is carried out in provincial parks with the cooperation of the parks branch of the Ontario Ministry of Natural Resources (OMNR). The primary purpose of this program is early detection of the spread of this introduced insect, which has become established in southern Ontario in recent years. In 1986, moth catches increased markedly in southern Ontario as well as in a number of locations in the Northeastern Region of northern Ontario. There will be increased surveillance in 1987 in all parks in which high moth catches were made last year. This pheromone trapping program will be repeated in both southern and northern Ontario, with increased emphasis on parks in which high moth catches were made in 1986.

Black Army Cutworm, *Actebia fennica* (Tausch.)

This insect can be a serious pest of newly established conifer plantations. It is especially harmful to plantations established on burned sites as these seem to be attractive to adult moths for egg-laying. It is therefore advantageous to monitor moth ctivity in areas that have been burned before planting programs are undertaken in order to adjust planting schedules if cutworm infestations should appear to be imminent. Accordingly, FIDS staff have been placing pheromone traps in a number of burned areas in the Northern Region and checking for subsequent larval populations in all areas in which high moth catches are made. This program will be continued in 1987.

Oak Leaf Shredder, *Croesia semipurpurana* [Kft.]

This experimental program is designed to develop pheromone trapping as a method of predicting oak leaf shredder populations to supplement or replace the more costly and time-consuming egg sampling method. Progress has been made on selecting the best type of trap to use and on testing various concentrations of pheromone. The program will be continued this year at trapping sites in the Northeastern, Central and Southwestern regions.

Plantation Surveys

Plantation surveys this year will concentrate on white spruce in both northern and southern Ontario. This is the third year in which white spruce has been examined and progress is being made in achieving the long-term goals of this study. The methodology will be the same as in previous years, with two visits to each plantation during periods selected to coincide with the feeding of expected pests. As in previous years, each FIDS technician will examine six plantations, two each in the <6 m, 2 m-6 m and <6 m categories. The results of this study will be incorporated with those of previous studies as part of the long-term program.

Cone and Seed Studies

This summer cone and seed studies will focus on white spruce throughout Ontario. Each FIDS technician will collect 100 green but fully mature white spruce cones, which will be shipped to GLFC for dissection and analysis. Wherever possible, cones will be collected from seed orchards or SPAs. The results of this survey will be compared with previous results as part of this long-term project.

Spring Gypsy Moth Survey

In response to concern expressed by management at the Petawawa National Forestry Institute (PNFI), a gypsy moth egg-mass detection survey was conducted this spring on PNFI property. Combined crews of FIDS and PNFI personnel carried out a week-long search program in all high-use areas of the establishment as well as in 21 susceptible forest stands. Despite this effort no signs of the insect were found. Increased surveillance including larval searches, burlap and pheromone trapping will be carried out this summer.

FOREST INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The 1986 summer and fall bulletins described the spruce budworm situation for that year. Briefly, some 8,855,687 ha of moderate-to-severe defoliation were recorded, a decline of approximately 3.5 million ha from the previous year's level. Substantial population declines were recorded in the Wawa, Hearst, Thunder Bay, Nipigon, Terrace Bay, Geraldton, Fort Frances and Dryden districts while increases occurred in the Red Lake and Sioux Lookout districts. Despite the widespread decline, a large infestation persisted from the Pagwa River-Marathon area westward to the Manitoba border.

Egg surveys in late 1986 showed an overall increase in egg-mass densities of about 16%. Most of the increase occurred in the Northwestern Region, where budworm populations are expected to remain high in most of the areas infested in 1986, with some possible expansion along the northern edge of the infestation. Similarly, infestations are expected to persist in the Atikokan and Nipigon districts although some population declines will probably occur in the southern Thunder Bay District and in the Terrace Bay and Geraldton districts. No defoliation of any consequence is expected in northeastern or southern Ontario.

Regular surveys will begin in northern Ontario during the week of 11 May; therefore, information on budworm development is sketchy at the time of writing. However, the early spring and the current warm, dry weather are expected to promote rapid development of spruce budworm and other insects.

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

The jack pine budworm situation in Ontario changed markedly in 1987, with substantial declines recorded in northeastern and southern Ontario as well as in the North Central Region of northwestern Ontario. Increases were mapped in a number of areas in the Northwestern Region. Over all, the area of moderate-to-severe defoliation declined by 53% to 1,743,725 ha. Most of this defoliation (800,000 ha) was in the Red Lake District but sizeable areas of defoliation were also recorded in the Sioux Lookout and Kenora districts and at one point near the four corners of the Dryden, Ignace, Atikokan and Fort Frances districts. Scattered pockets of moderate-to-severe damage also occurred through the Northern and Northeastern regions and in the Parry Sound District of the Algonquin Region.

Egg-mass counts in the fall of 1986 showed substantial reductions in density in all parts of the province except the Northwestern Region, where the decline was much less pronounced. Consequently, populations will collapse in most of the province. In the Northwestern Region, pockets of moderate or, in a few cases, severe defoliation will probably occur within areas infested in 1986, particularly in Dryden, Fort Frances and Kenora districts. Accurate forecasts are difficult to make when an infestation is in a declining phase. Increasing but variable effects of natural mortality factors, particularly parasites, are the cause of uncertainty.

Early surveys indicate that overwintering jack pine budworm larvae began emerging in northwestern Ontario during the week of 11 May.

Gypsy Moth, *Lymantria dispar* L.

Gypsy moth populations were reduced sharply in 1986, with the overall area of moderate-to-severe defoliation declining from 246,342 ha to 167,776 ha. Most of the decline occurred in the older parts of the infestation, mainly in the central Tweed District, while populations continued to expand on the periphery of the infestation. Egg-mass surveys in the fall of 1986 indicate that the trend described above is likely to continue in 1987.

Gypsy moth egg hatch was slightly higher than normal this year because of unseasonally warm weather in late April and early May.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

The current forest tent caterpillar infestation doubled in size in 1986 when the area of moderate-to-severe defoliation increased to 433,000 ha. A great deal of the infestation (333,190 ha) occurred along the Quebec border in a long band in the North Bay, Temagami and Kirkland Lake districts of the Northeastern and Northern regions. Other sizeable areas of infestation were in the Gogama, Chapleau, Wawa, Sudbury, Espanola, Blind River, and Parry Sound districts. Infestations declined markedly in the Thunder Bay District. Egg-band counts made in the fall of 1986 indicate that populations will probably continue to increase in most of the above-noted areas with the exception of Thunder Bay, where continued declines are expected. The forest tent caterpillar egg hatch was also somewhat earlier than normal and initial reports indicate high numbers in a few of the areas previously mentioned.

Eastern Tent Caterpillar, *Malacosoma americanum* F.

Early observations indicate that high populations of this unsightly pest are again present in a number of areas in southern Ontario, including parts of the Central, Algonquin and Eastern regions.

Bruce Spanworm, *Operophtera bruceata* (Hlst.)

A few early reports of scattered populations of this spring pest of hardwoods have been received from the Algonquin Region and the Sault Ste. Marie District of the Northeastern Region. The insects are still quite small, however, and accurate assessment of larval populations is not possible at this time.

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